

A 50.0 g sample of water at 80.0 °C is mixed in a calorimeter with a 50.0 g sample of water at 5.0 °C. What is the final temperature of the water?

$$\boxed{50.0g + 50.0g} = ?$$

$$Q_{abs} = -Q_{rel}$$

$$m_{H_2O} c_{H_2O} (T_f - T_i) = -m_{H_2O} c_{H_2O} (T_f - T_i)$$

$$\cancel{50.0g} \cdot \cancel{4.184} \frac{J}{g^\circ C} (T_f - 80) = -\cancel{50.0g} \cdot \cancel{4.184} \frac{J}{g^\circ C} (T_f - 5)$$

$$T_f - 80 = -(T_f - 5)$$

$$T_f - 80 = -T_f + 5$$

$$T_f + T_f = 80 + 5$$

$$2T_f = 85$$

$$T_f = 42.5^\circ$$

5 g of iron at 75.0 °C is added to 150.0 g of water at 15.0 °C in a calorimeter. What is the final temperature of the iron and the water? (For iron, $c = 0.444 \text{ J/g} \cdot ^\circ\text{C}$.)

